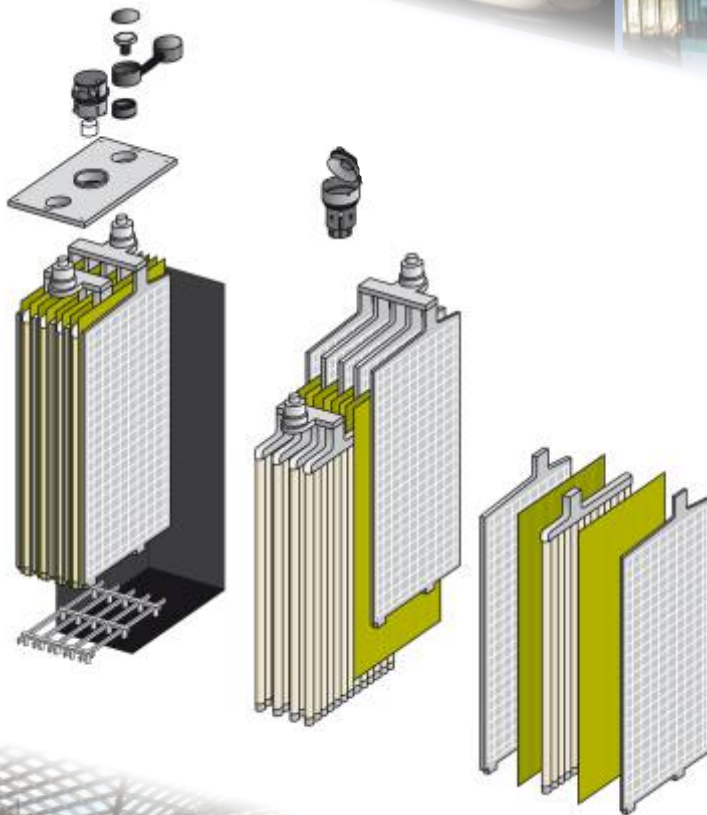


PerfectRail™ 3PzS210



*Lead-Acid Battery Technology
for Rolling Stock Applications*



Robust cell construction

Low maintenance

Shock and vibration resistant

Very high cycle performance

V-0 Flame retardant



Keeping you on track

Hawker® PerfectRail™ 3PzS210

Technical specifications

Part number: 3563096

Electrical Data

Nominal voltage	2 V
Number of cells	1 (Lead-Acid tubular Technology)
Specific gravity of acid	1.24 kg/l (at 30°C) on request 1.27 and 1.29 available
Rated capacity C ₁₀ to 1.80 Vpc at 20 °C	218 Ah
Rated capacity C ₅ to 1.70 Vpc at 30 °C	210 Ah
Current/Power for 0.25 h back-up time 1.60 Vpc 20 °C	266.9 A / 436 W
Current/Power for 0.5 h back-up time 1.60 Vpc 20 °C	198.4 A / 335 W
Current/Power for 1.0 h back-up time 1.60 Vpc 20 °C	129.6 A / 229 W
Current/Power for 3.0 h back-up time 1.70 Vpc 20 °C	57.4 A / 107 W
Current/Power for 5.0 h back-up time 1.75 Vpc 20 °C	38.3 A / 73 W
Current/Power for 8.0 h back-up time 1.75 Vpc 20 °C	26.7 A / 51 W
Current/Power for 10.0 h back-up time 1.80 Vpc 20 °C	21.8 A / 42 W
Current/Power for 24.0 h back-up time 1.80 Vpc 20 °C	10.7A / 22 W
Conversion to capacity at 25 °C	103 % of Current/Power at 20°C
Internal resistance	1.07 mΩ
Short circuit current	1.90 kA
Self discharge at 20 °C	max 6% / Month
Heat loss during float service at 20°C	≈ 0.29 W

Mechanical Data

Weight	14.2 kg ±2%
Height of cell / over terminal cover	405 mm / 435 mm
Width	198 mm
Depth	65 mm
Number of terminals	1 + / 1 -
Dimension of terminal screw hole	M10 x 22 deep, female thread
Torque terminal screw	25 Nm ±2
Terminal insulation class according to IEC/EN 60529	IP 20
Diameter of diagnostic hole for voltage probe	2 mm
Maximum cable cross-section	95 mm ²
Connector and terminal connection	use flexible EVO or PerfectPlus - connectors
Connector (copper, tin-coated and insulated)	For Rolling Stock flexible connectors are recommended
Shock + Vibration rating (according)	Category 1, Class B (IEC 61373:2011)

Environmental Data

Installation	vertically
Cell assembly distance	not required; for higher loads 5-10 mm recommended for cooling
Material of case/cover; Flame retardancy rating (according to)	PP - FR or PP (on request) V-0 (UL94); I2 / F1 (NF F 16-101) or HB (UL94)
Rail service life expected at 15 °C	6 Years (max 30% DoD / day)
Cycle Endurance (DB Test : 30% DOD/8h)	> 80% C _{nom} after 1'300 cycles
Design life	12+ Long Life, according Eurobat Classification
Shipping name	Batteries, wet, filled with acid

Hawker® PerfectRail™ 3PzS210

Operating specifications

Figure 1



Figure 2

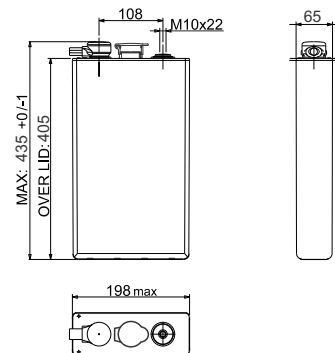
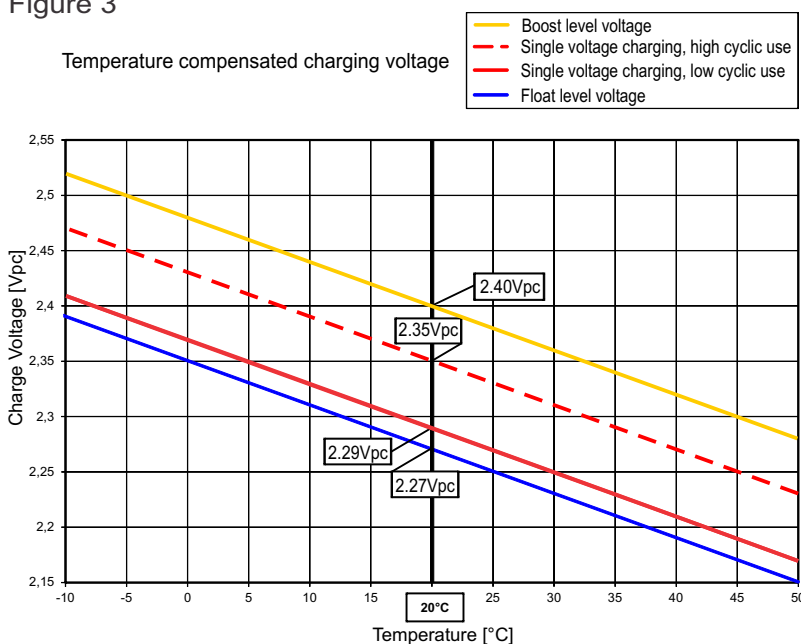


Figure 3



Temperature in °C	Percent of the rated capacity (C ₅)
40	113
35	109
30	106
25	103
20	100
15	97
10	93
5	89
0	84
-5	77
-10	70
-15	62
-20	52
-25	40
-30	29

*Estimated Values
Should be verified with actual load profile*

Battery installation and operation

Recommended charging for rolling stock applications (standby parallel operation)	IU0U - charging : 2 level charging (acc. DIN 41773) with current limitation and temperature compensation
Boost level voltage setting at 20°C	2.40 Vpc (Volt per cell)
Lower or single level voltage setting at 20°C	2.29 ... 2.35 Vpc (low ... high cyclic use)
Charge current for IU or IU0U-charging (DIN 41773)	38 ... 57 A (minimum for cyclic use: 48 A)
Voltage compensation in function of temperature	- 4 mV/K per cell
Float level voltage setting at 20°C (± 1%)	2.27 Vpc (valid for long term trickle charging at workshop and storage)
Air exchange	According to EN 50272-2 : 2001 $Q = 0.05 * N_{cells} * I_{gas} * C_{AhC10} * 10^{-3} [m^3/h]$ $I_{gas} = 5$ (at 2.29 Vpc) ; $I_{gas} = 20$ (at 2.40 Vpc)
Water refill	manual / optional 'aquamatic' system
Preferred operating temperature range	Between 15°C - 25°C
Maximum long term operating temperature	+40°C with ventilation assured (reduced service life)
Maximum short term operating temperature (< 3h)	+50°C with ventilation assured (reduced service life)
Minimum operating and storage temperature	- 40°C (in charged condition)

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Discharge data per cell

Constant current performance [Ampere] to the defined end of discharge voltage

Voltage [Vpc]	Temp	Discharge time [h:min]																		
		0:01	0:05	0:10	0:15	0:20	0:25	0:30	0:40	0:50	1:00	1:30	2:00	3:00	4:00	5:00	8:00	10:00	12:00	24:00
1.90	20°C	129.3	129.3	129.3	126.0	117.8	110.7	104.5	94.3	86.1	79.3	64.7	55.2	43.1	35.9	31.0	22.3	18.8	16.4	9.3
	25°C	129.3	129.3	129.3	127.9	120.0	113.1	107.0	96.8	88.6	81.7	66.9	57.1	44.6	37.1	32.1	23.0	19.4	16.9	9.5
1.85	20°C	176.0	176.0	166.7	153.5	142.5	133.1	125.1	112.0	101.6	93.0	74.9	63.2	48.7	40.0	34.3	24.4	20.6	17.9	10.2
	25°C	176.0	176.0	169.0	156.4	145.6	136.4	128.4	115.4	104.9	96.3	77.8	65.6	50.6	41.5	35.6	25.3	21.3	18.5	10.4
1.80	20°C	224.6	218.2	195.8	179.0	165.3	154.0	144.1	127.6	114.8	104.6	83.1	69.4	52.9	43.1	36.7	25.9	21.8	18.9	10.7
	25°C	224.6	220.5	198.9	182.7	169.2	158.0	148.4	132.0	119.0	108.6	86.6	72.3	55.1	44.8	38.1	26.8	22.6	19.5	11.0
1.75	20°C	272.9	251.1	223.7	203.1	186.5	172.6	160.7	141.3	126.1	114.0	89.4	74.1	55.8	45.2	38.3	26.7	22.3	19.3	10.8
	25°C	272.9	254.1	227.8	207.8	191.5	177.6	166.0	146.6	131.2	118.9	93.4	77.3	58.2	47.1	39.8	27.7	23.1	20.0	11.1
1.70	20°C	320.0	282.7	250.3	225.8	206.0	189.3	175.3	152.7	135.3	121.5	94.0	77.3	57.4	46.0	38.6	26.7	22.3	19.3	10.8
	25°C	320.0	286.4	255.2	231.5	212.2	195.8	181.7	159.0	141.2	127.1	98.4	80.9	60.1	48.1	40.3	27.7	23.1	20.0	11.1
1.65	20°C	365.6	312.9	275.4	247.2	223.8	204.3	187.9	161.9	142.5	127.1	96.5	78.0	57.4	46.0	38.6	26.7	22.3	19.3	10.8
	25°C	367.6	317.3	281.3	253.9	231.2	212.0	195.6	169.2	149.3	133.4	101.6	82.0	60.1	48.1	40.3	27.7	23.1	20.0	11.1
1.60	20°C	375.2	341.4	299.4	266.9	239.8	217.1	198.4	169.2	147.8	129.6	96.5	78.0	57.4	46.0	38.6	26.7	22.3	19.3	10.8
	25°C	375.2	346.5	306.4	275.0	248.7	226.3	207.3	177.4	155.3	137.0	101.6	82.0	60.1	48.1	40.3	27.7	23.1	20.0	11.1

Constant power performance [Watt per cell] to the defined end of discharge voltage

Voltage [Vpc]	Temp	Discharge time [h:min]																		
		0:01	0:05	0:10	0:15	0:20	0:25	0:30	0:40	0:50	1:00	1:30	2:00	3:00	4:00	5:00	8:00	10:00	12:00	24:00
1.90	20°C	244.3	244.3	244.3	240.0	224.7	211.5	200.2	180.9	165.5	153.0	125.3	107.4	84.2	70.5	60.9	44.1	38.0	33.4	19.4
	25°C	244.3	244.3	244.3	243.6	228.8	216.0	204.7	185.7	170.2	157.3	129.5	110.9	87.3	72.9	63.0	45.4	39.1	34.3	19.8
1.85	20°C	323.4	323.4	308.0	285.0	265.2	248.5	234.2	210.7	191.7	176.0	142.7	120.8	94.0	77.3	66.7	47.7	40.8	35.9	20.9
	25°C	323.4	323.3	312.2	289.8	270.9	254.6	240.1	216.6	197.7	182.1	147.8	125.4	97.5	80.2	69.1	49.4	42.0	36.9	21.4
1.80	20°C	403.3	392.1	352.7	323.5	299.9	280.2	263.1	235.0	212.8	194.7	155.5	131.0	100.7	82.5	70.4	50.0	42.4	37.3	21.8
	25°C	403.4	396.2	358.3	329.9	306.7	287.1	270.5	242.5	220.1	201.8	161.8	136.3	104.7	85.8	73.1	51.8	43.8	38.4	22.4
1.75	20°C	476.0	439.5	393.1	358.1	330.3	307.1	287.2	254.2	229.2	208.8	165.3	137.8	105.0	85.8	72.7	51.1	43.1	37.8	22.0
	25°C	476.0	444.3	400.1	366.0	338.9	315.8	296.1	263.3	237.6	217.1	172.5	143.6	109.3	89.3	75.7	53.2	44.7	39.0	22.6
1.70	20°C	543.4	480.7	427.9	388.6	356.7	329.9	307.1	270.0	241.1	219.0	171.9	142.0	107.3	87.1	73.4	51.2	43.1	37.8	22.0
	25°C	543.4	486.9	435.6	398.3	366.6	340.2	317.7	280.4	251.0	228.1	179.8	148.5	112.2	90.9	76.6	53.2	44.7	39.0	22.6
1.65	20°C	604.4	518.4	457.8	414.1	378.5	348.4	323.0	281.9	250.2	225.7	176.1	143.4	107.3	87.1	73.4	51.2	43.1	37.8	22.0
	25°C	606.2	525.2	467.1	424.5	390.0	360.4	334.9	293.6	261.4	235.6	184.5	150.6	112.3	90.9	76.6	53.2	44.7	39.0	22.6
1.60	20°C	614.9	550.0	484.7	435.6	395.9	362.8	335.0	290.6	256.7	229.5	176.2	143.4	107.3	87.1	73.4	51.2	43.1	37.8	22.0
	25°C	616.0	557.9	495.7	447.6	409.0	376.3	348.2	303.4	268.7	241.1	185.0	150.6	112.3	90.9	76.6	53.2	44.7	39.0	22.6

Constant discharge values without voltage loss in connectors and cables!
Our technical support offers to calculate the discharge curve for a specific load profile.



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